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COMPLETE SPECIFICATION.

Improvements in Syringes.

I, EDWARD BLISS WILDER, of the City of St Louis, State of Missouri, United States of America, Merchant, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 My invention relates to syringes and has for its principal objects to make the syringe self-charging, to secure a rapid action and to utilize the pressure of the liquid for expanding the bulb. It consists in the parts and in the arrangement and combination of parts hereinafter described and claimed.

10 In the accompanying drawings Figure 1 is an elevation of the complete apparatus, and Figure 2 is a vertical section of a part thereof.

My device comprises a receptacle 1 of metal or hard rubber or other suitable material and is preferably rigid and of sufficient weight to sink when placed in a body of water. This receptacle has an opening preferably in its bottom. In order that the opening may not be obstructed, when the receptacle rests upon 15 the bottom of the tank, the bottom of the receptacle is provided with a number of bosses or feet. The opening in the bottom is controlled by a valve 2 which consists of a disk of soft rubber or other suitable material adapted to rest upon the raised margin of the hole. A spider or skeleton cage 3 fastened to the bottom inside of said receptacle surrounds said valve and serves as a guide and 20 limiting stop therefor. Obviously, this valve 2 may be of any suitable type adapted to close automatically so as to be normally seated but adapted to yield automatically to pressure from outside of the receptacle.

The top of the receptacle is provided with a threaded opening in which is fitted a threaded cap piece or plug. This threaded cap piece is provided with 25 two hollow nipples which extend through said cap piece and have their outwardly projecting ends adapted for connection to two rubber tubes 6, 10. One of the nipples terminates inside of the receptacle near the top thereof and is connected by means of the rubber tube 10 to an elastic bulb 11. This bulb is of the ordinary kind adapted to be squeezed or manipulated by hand and its 30 capacity is less than the capacity of the receptacle above the opening into the discharge tube. The other nipple is connected by the flexible tube 6 to an ordinary discharge nozzle 7. This last mentioned nipple has its inner end prolonged nearly to the bottom of the receptacle and is equipped (preferably in its externally projecting portion) with a valve seat upon which seats an ordinary check valve 8 35 arranged to open upwardly automatically to permit the discharge of liquid, and to seat automatically when the pressure from the inside is relieved. By this arrangement, the nipple constitutes the lower portion of the discharge passage-way or tube, whose lower opening is close to the bottom of the receptacle.

The operation of the device is as follows: the receptacle 1 is immersed in the 40 liquid to be injected and the pressure bulb 11 is squeezed by hand to drive the air therefrom. So long as the pressure bulb is collapsed, the liquid which enters the receptacle from below can rise only a short distance above the opening into the discharge tube. The difference between the levels of the liquid inside and outside of the receptacle causes an upward pressure on the air confined in said receptacle. When the hand pressure on the bulb is released, the 45

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difference in the levels of the liquid causes the liquid to rise in said receptacle through the valve 2 which opens automatically so as to admit liquid into the receptacle. The air inside of the receptacle being compressed by this pressure flows into the bulb and inflates it. The air thus compressed acts as a motive fluid to expand the bulb; and as the air acts independently of the elasticity of the bulb, the bulb is much quicker in its action than the bulb in the construction commonly used where the replenishing of the liquid is effected by the suction created by the elasticity of the bulb. It is noted that the invention is of the greatest efficiency when the difference between the level of the liquid outside of the receptacle and the level inside thereof is greatest, and that the hydrostatic pressure ceases to be effective in charging the receptacle when the liquid in the receptacle rises to the level of the liquid outside thereof. If the level of the liquid outside of the receptacle falls to the level inside, the resiliency of the bulb will cause it to continue to act by suction. The receptacle is thus charged with the liquid automatically and thereupon the valve 2 therein closes. When the bulb is again squeezed the liquid is forced through the discharge tube, the automatic valve therein opening to permit such action, whereon the valve again closes. The pressure on the bulb is again released to replenish the receptacle with liquid and the operation above noted repeated. One of the principal advantages of this mode of operation is, that the pressure bulb and discharge nozzle may be manipulated at a considerable distance from the receptacle.

I connect the two tubes together by the sliding bands 12 which may be moved from one part to another as desired.

Obviously the device hereinbefore described admits of considerable modification without departing from my invention and I do not wish to restrict myself to the specific construction herein described.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A syringe comprising a receptacle adapted to be immersed in the liquid, a pressure bulb, and a tube connecting said receptacle and the bulb, all arranged so that when said receptacle is submerged and charged the level of the liquid therein is lower than the level of the main supply, whereby the hydrostatic pressure of such supply is effective in charging said receptacle, substantially as described.

2. A syringe comprising a receptacle adapted to be immersed in the liquid, said receptacle having a valved opening for the admission of liquid and having a pressure bulb and a discharge tube, the capacity of said receptacle above the opening of the discharge tube being greater than the capacity of said bulb, whereby the hydrostatic pressure of the liquid is effective in charging said receptacle, substantially as described.

3. A syringe comprising a receptacle adapted to be immersed in the liquid, said receptacle having a valved opening for the admission of liquid and having a pressure bulb and a discharge tube, the capacity of said receptacle above the opening of the discharge tube being greater than the capacity of said bulb, whereby the hydrostatic pressure of the liquid is effective in charging said receptacle, said discharge tube having an automatic valve therein, substantially as described.

4. A syringe comprising a receptacle adapted to be immersed in the liquid, said receptacle having a valve opening for the admission of liquid and having a pressure bulb and a discharge tube, the capacity of said receptacle above the opening of the discharge tube being greater than the capacity of said bulb, whereby the hydrostatic pressure of the liquid is effective in charging said receptacle, said discharge tube having an automatic valve at its lower end, substantially as described.

5. A syringe comprising a receptacle adapted to be immersed in the liquid,

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said receptacle having a valved opening at one end adapted to admit liquid, and having a pressure bulb communicating with its opposite end and said receptacle also having a discharge tube communicating therewith near said valved opening all arranged so that when the receptacle is submerged and fully charged, the
5 level of the liquid therein is lower than the level of the main supply, substantially as described.

6. A syringe comprising a receptacle adapted to be immersed in the liquid, said receptacle having a valved opening at one end adapted to admit liquid and having a pressure bulb communicating with its opposite end and said receptacle
10 also having a discharge tube communicating therewith near said valved opening, said pressure bulb being of less capacity than the capacity of said receptacle, whereby the hydrostatic pressure of the liquid is effective in charging said receptacle, substantially as described.

7. A syringe comprising a receptacle adapted to be immersed in the liquid,
15 said receptacle having a valve opening at one end adapted to admit liquid and having a pressure bulb communicating with its opposite end and said receptacle also having a discharge tube communicating therewith near said valved opening, said pressure bulb being of less capacity than the capacity of said receptacle, whereby the hydrostatic pressure of the liquid is effective in charging said
20 receptacle, said discharge tube having an automatic valve therein, substantially as described.

Dated this 17th day of February 1903.

For the Applicant

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